REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 1-13 are pending in this application. Claims 1, 3, 5, 8, 10, and 12 are independent. The remaining claims depend, directly or indirectly, from claims 1, 3, 5, 8, 10, and 12. Claims 1, 3, 5, 8, 10, and 12 have been amended in this reply to clarify the present invention recited. No new matter has been introduced by these amendments.

Rejections under 35 U.S.C § 102

A. Marx

Claims 1-3, and 5-12 stand rejected under 35 U.S.C. § 102 as being anticipated by EP 0779666 (Marx). Claims 1, 3, 5, 8, 10, and 12 have been amended in this reply to clarify the present invention recited. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

The present invention relates to novel methods for producing novel structures for gallium nitride compound semiconductors. In particular, embodiments of the present invention provide for creating a spatial fluctuation in a band gap by producing a change in the compositional ratio. Other embodiments describe the creation of spatial fluctuation in the band gap by varying the diffusion lengths of composition materials. Further,

certain embodiments of the present invention provide for spatial fluctuation by creating a lattice mismatch. The various embodiments are described, for example, on pages 3-5 of the specification as originally filed.

As a result of the spatial fluctuation in the band gap of a light emitting layer (as recited in the independent claims), the present invention advantageously causes carriers to be recombined in a narrow region in the band gap, whereby light emitting efficiency is effectively increased, irrespective of the presence or absence of dislocation. Thus, by *intentionally* creating spatial fluctuation in the band gap of a light emitting layer, the present invention realizes heretofore unseen advantages over prior art methodologies.

In particular, claims 1-4 and 8-11 require the creation of variation in the compositional ratio of a light emitting layer for formation of spatial fluctuation in a band gap. This process of varying the ratio, which in some embodiments is accomplished by doping, is described, for example, on page 6 of the specification.

Claims 5-7 and 12-13 recite limitations directed to forming a base layer on a substrate that has a lattice mismatch, whereby a spatial fluctuation is created in the band gap of the gallium nitride compound semiconductor (the light emitting layer) by the lattice mismatch. In an analogous fashion to claims 1-4 and 8-11 the spatial fluctuation is achieved by varying the compositional ratio of a light emitting layer, which is shown, for example, in Figure 3 of the present invention (and its related description).

In contrast to the above, Marx merely discloses disposing a uniform buffer layer on a stress absorbing layer in a semiconductor device. Marx is absolutely silent with respect to the concept of creating a variation in a compositional ratio of a light emitting layer, as required by the claims of the present invention. Nor would such a result

inherently flow from the techniques described by Marx in the formation of the semiconductor devices described in Marx.

In view of the above, Marx fails to show or suggest the present invention as recited in the claims as amended. Thus, the claims as amended are patentable over Marx. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

B. Nagahama

In addition to the rejection over Marx, claims 1-3, and 5-13 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,172,382 (Nagahama). Claims 1, 3, 5, 8, 10, and 12 have been amended in this reply to clarify the present invention recited. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, the present invention provides spatial fluctuation in the band gap as a result of the modified composition. As a result of the spatial fluctuation in the band gap of a light emitting layer (as recited in the independent claims), the present invention advantageously causes carriers to be recombined in a narrow region in the band gap, whereby light emitting efficiency is effectively increased, irrespective of the presence or absence of dislocation. Thus, by *intentionally* creating spatial fluctuation in the band gap of a light emitting layer, the present invention realizes heretofore unseen advantages over prior art methodologies.

Nagahama discloses a nitride semiconductor device that includes a light emitting device, which comprises, a n-type region of one or more nitride semiconductor layers having n-type conductivity, a p-type region of one or more nitride semiconductor layers

having p-type conductivity, and an active layer between the n-type region and the p-type region. Moreover, Nagahama discloses a "super lattice layer comprising first and second layers which are nitride semiconductors having a different composition respectively." Nagahama, *Abstract.* Thus, in Nagahama the different composition is *between* the layers.

However, as with Marx above, Nagahama is silent as to varying the compositional ratio within a light emitting layer. As a result, the claimed spatial fluctuation in the band gap of a light emitting layer, which causes carriers to be recombined in a narrow region in the band gap, is not found in Nagahama. Nor does this property inherently flow from the disclosed techniques in Nagahama.

In view of the above, Nagahama fails to show or suggest the present invention as recited in the claims as amended. Thus, the claims as amended are patentable over Nagahama. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection(s) under 35 U.S.C § 103

Claim 4 stands rejected under 35 U.S.C. § 103 as being obvious over either Marx or Nagahama further in view of Sakai et al. This rejection is respectfully traversed.

As discussed above, the present invention provides spatial fluctuation in the band gap as a result of the modified composition. As a result of the spatial fluctuation in the band gap of a light emitting layer (as recited in the independent claims), the present invention advantageously causes carriers to be recombined in a narrow region in the band gap, whereby light emitting efficiency is effectively increased, irrespective of the presence or absence of dislocation. Thus, by *intentionally* creating spatial fluctuation in

the band gap of a light emitting layer, the present invention realizes heretofore unseen advantages over prior art methodologies.

As discussed in detail above, neither Marx nor Nagahama show or suggest varying the compositional ratio within a light emitting layer. Sakai also fails to show or suggest what the primary references lack.

As such, claim 4 cannot be obvious over either of the cited prior art references. Accordingly, withdrawal of this rejection is respectfully requested.

Applicant respectfully requests acknowledgement of all previously submitted Information Disclosure Statements by Examiner, namely the Information Disclosure Statements filed with the U.S. Patent and Trademark Office February 6, 2003 and on July 15, 2003.

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 08228.021001).

Respectfully submitted,

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